Goddard Space Flight Center 2009 Sample Student Projects

Required Academic Level

Junior/Senior Undergraduate, Graduate/Masters, Graduate/Doctorate

Category

Space Science

Subcategory

Astrophysics

Project Title

Optical Properties of Astronomical Silicates in the Infrared

Project Description

Astronomical dust is ubiquitous. It has been found in our own solar system, around nearby stars with debris disks, in star formation regions, and even in far-distant galaxies. This dust shields sources from our view at optical wavelengths, reprocesses short-wavelength light to longer wavelengths, and provides an environment where planets can form and grow. This program is designed to directly address two major questions: (1) What are the optical properties of dust grains in the far-infrared? and (2) How do these properties vary as a function of wavelength, temperature, and crystallinity? By using five different experimental apparatus, we are able to derive the complex dielectric constant for a wide range of materials. In turn, this allows us to predict spectral signatures that may be present in spectra of astronomical sources. We are looking for a student to participate in this program. A successful applicant will be involved in one or more of the following areas: (1) Developing new experimental hardware; (2) Acquisition and analysis of data from different experiments; (3) Application of data to existing astronomical observations and/or to theoretical models of dust behavior. Skills and disciplines listed above are of value, but none are strictly required.

Mentor's Expectation of Student

The successful candidate will work with the project team on one or more of the areas listed above, depending upon the interest and expertise of the intern. Because of the cross-disciplinary nature of this program, we encourage interest from a wide range of applicants. A successful intern will show dedication to the project, as well as the ability to "self-start". He/she will have the opportunity to learn about the roles dust plays in astrophysics, as well as in planetary science, while also learning about the fabrication and operation of new experimental apparatus.

Discipline of Project and/or Background Needed to successfuly complete the project

Astronomy: Astrophysics, Cosmology; Planetary Science, Engnr: Electrical, Mechanical; Analysis; Physics

Skills

Listening/Note Taking, Cryogenics, Optics, Assembly, Fabrication, Electronics Testing,IDL, LabView, SolidWorks